While visiting a friend near Lake Champlain I had the opportunity to explore a marshy region where Charcoal Creek empties into Missisquoi Bay, also the drier, gravelly fields near by and the shore along the Bay. On the drier gravel in a pasture I found a tiny plant that I recognized as a species of *Euphrasia*. I sent the specimen to the Gray Herbarium, where it was identified as *Euphrasia stricta* Host.

All about in this pasture, in full bloom, was *Gerardia paupercula*. In the swamps and wetter places and along the wet strand of the beach the ground was almost yellow with the blossoms of *Gratiola aurea;* and along the gravelly and rocky shore the tiny *Ranunculus Flammula*, var. *reptans* grew in abundance. On the drier shore was *Polanisia graveolens* in some quantity, also *Artemisia caudata;* and in the shallow water of the Bay was a miniature forest of the Giant Bulrush, *Scirpus occidentalis*.—Arthur E. Blewitt, Waterbury, Connecticut.

MONOGRAPHIC STUDIES IN THE GENUS ELEOCHARIS

H. K. Svenson

(*continued from page 162*)

Series Pauciflorae

(Plate 189)

a. Scales pale or, if dark, with the culms at least 1.5 dm. high and the achenes 2–3 mm. long....*b*.
b. Scales light-brown or stramineous to chocolate-brown; culms 1.5 dm. or more in height; achenes 2–3 mm. long....*c*.
c. Culms coarse, compressed, 1–2 mm. wide....*d*.
d. Spikelets 9–20 mm. long, 12–20-flowered; culms often rooting at tip.....18. *E. rostellata.*
d. Spikelets 5–9 mm. long, 9–12-flowered
17. *E. pauciflora* var. *Suksdorfiana.*
c. Culms slender, scarcely compressed, less than 1 mm. in diameter....*e*.
e. Beak of achene 1 mm. long; spikelets broadly ovate.20. *E. macrantha.*
e. Beak of achene not exceeding 0.5 mm.; spikelets ovate....*f*.
f. Rhizomes not forming a dense indurated turf..17. *E. pauciflora.*
f. Rhizomes forming a dense indurated turf; culms glaucous and arching.....17. *E. pauciflora* var. *bernardina.*
b. Scales usually green, often with brown sides; plants always dwarf, 2–5 (rarely –7) cm. high; achenes 1–1.5 mm. long....*g*.
g. Achenes sharply triangular, smooth and shiny; bristles equaling the achene.....16. *E. parvula.*
g. Achenes with blunt outer angle, minutely verrucose, dull; bristles lacking.....19. *E. leptos.*
a. Scales dark, reddish-brown to black; culms 2–15 cm. high; achenes 1–1.5 mm. long (Andean species)....*h*.

h. Spikelets 8–15-flowered; achenes 1 mm. long, golden-yellow; style-base as wide as the achene.....24. *E. Brehmeriana.*
h. Spikelets 3–8-flowered; achenes 1.5 mm. long....*i.*
i. Scales black; style-base as broad as the apex of the achene
• 21. *E. albibracteata.*
i. Scales brown; style-base narrower than the apex of the achene, a whitened ridge present at the junction with the body of the achene....*j.*
j. Culms 9–14 cm. long; spikelets 3–5 mm. long; outer angle of achene acute.....22. *E. boliviana.*
j. Culms 1–8 cm. long; spikelets 2.5–3 mm. long; outer angle of achene blunt.....23. *E. nubigena.*

16. E. PARVULA (R. & S.) Link. FIG. 18. Forming mats: roots fibrous, often with minute tuberous stolons: culms capillary (2–7 cm. high), greenish or straw-colored, often spongy and translucent, terete, becoming somewhat striate in drying: upper sheath inconspicuous, membranous; spikelets 2–3.5 mm. long, broadly ovate, 2–9-flowered: scales ovate, scarcely keeled, obtuse or acute, striate and chartaceous, green to yellowish, often dull-brown on the sides; lowest scale empty, half the length of the spikelet: stamens 3: style 3-fid: achenes obovate, 1–1.4 mm. long, straw-colored, equilaterally triangular with prominent angles, smooth and shining, under high magnification sometimes lightly striate-reticulate: style-base very small, triangular, greenish: bristles straw-colored, equaling or exceeding the achene.—Link ex Bluff, Nees & Schauer in Bluff & Fingerhuth, Comp. Fl. Germ. ed. 2. i. part i. 93 (1836);[1] Hook. Brit. Fl. ed. 5. 418 (1842); Palla in Engler, Bot. Jahrb. x. 299 (1889) and in Koch, Syn. ed. 3, iii. 2542 (1907); Hegi, Ill. Fl. Mitteleur. ii. 41, fig. 198 (? 1909). *Scirpus pusillus* Vahl. Enum. ii. 246 (1805); Pursh, Fl. Am. Sept. i. 54 (1816); Torr. Fl. N. Mid. St. i. 46 (1824). *S. fluitans* Spreng. Mant. i. 4 (1807), not L. *S. nanus* Spreng. Pugill. i. 4 (1813); Wallr. Annus Botanicus (Fl. Hal. Suppl. iii.) 7 (1815); Robinson & Fernald in Gray, Man. ed. 7. 189 (1908); not Poir. *S. pollicaris* Del. Fl. Egypte Ill. 50. t. 63, fig. 10 (1813).[2] *S. capillaceus* Ell. Sk. Fl. S.

[1] This is unquestionably the first publication and refers to *Eleogiton parvula* Link, Hort. Berol. i. 285 (1827) with full synonymy. Sprague, Kew Bull. 1920: 72–74 (1920), has compiled a list of the plants published in Bluff & Fingerhuth, Comp. Fl. Germ. ed. 2, overlooked by the Index Kewensis, but *Eleocharis parvula* does not occur in this list.

[2] Pritzel lists only 62 plates. Of the two copies at the Gray Herbarium, one has 62 plates, the other 64 plates. No description accompanies the name in the text, nor is there any reference to the figure, which is in a separate volume, without date. The figure, however, is an excellent one, clearly the species which we are describing, and is accompanied by the name, *Scirpus pollicaris*. Since the text name is a *nomen nudum*, the date of publication of *S. pollicaris* is the date of issue of the plate. Plates 63 and 64 are marked in the upper left hand corner "Flore d'Egypte par M. Delisle (Supplément)," and they were unquestionably completed subsequent to 1813 and probably later than 1817, the date of publication of *Scirpus parvulus*. Monographers who have dealt with plants figured on these plates (there are 34 excellent figures) have invariably omitted the date of issue. The only references which I have been able to obtain are the three following:

(1) Hackel, Flora, lxiii. 475 (1880). Hackel states that the supplementary plates

Car. i. 75 (1816), not Michx. *S. parvulus* R. & S. Syst. ii. 124 (1817); Reichb. Ic. Fl. Germ. viii. fig. 706 (1846); Anderss. Cyp. Skand. 9, t. 1, fig. 20 (1849); Meinshausen, Acta Hort. Petrop. xviii. 258 (1901); Aschers. & Graebn. Syn. ii.[2] 297 (1904); Rouy, Fl. France, xiii. 385 (1912); Birger, Sv. Bot. Tidsk. vi. 608–618, 1 map (1912); Blomgren in Holmberg, Skand. Fl. 310 (1926). *S. humilis* Wallr. Sched. Crit. 27 (1822). *Eleogiton parvula* Link. Hort. Berol. i. 285 (1827). *Limnochloa parvula* Reichb. in Moessl. Handb. ed. 2, iii. 1808 (1829) and Fl. Germ. Excurs. 78 (1830). *Baeothryon nanum* A. Dietr. Sp. Pl. ii. 91 (1833). *B. pusillum* A. Dietr. Sp. Pl. ii. 92 (1833). *Eleocharis pygmaea* Torr. Ann. Lyc. N. Y. iii. 313 (1836). *S. translucens* Legall in Lloyd, Fl. Loire Inf. 275 (1844). *Chaetocyperus pygmaea* Walpers, Ann. iii. 683 (1852–1853), wrongly ascribed to Torrey. *Cyperus parvulus* Missbach & Kraus in Sturm, Fl. Deutsch. ed. 2, ii. 26, t. 7 (1900).—Salt marshes and brackish mud or sand along the seacoast, rare inland in salt lakes, Newfoundland to Louisiana and the West Indies, inland in New York, Michigan, and Minnesota (?), and on the Pacific coast from northern California to Washington and British Columbia;[1] Atlantic coast of Europe north to Norway, and on the Mediterranean coast of Europe and North Africa. Also at Rio de Janeiro, Brazil. Reported by Ascherson and Graebner (l. c.) from South Africa and Japan. The record from South Africa is undoubtedly based on Sprengel, Syst. 205 (1825) "Sc. parvulus R. et Sch. e. *C. B. S.* simillimum habeo" and has not been substantiated. I do not know the source of the report from Japan. The following, from the numerous specimens examined, are cited as typical. NEWFOUNDLAND: Norris Arm, *Fernald & Wiegand*, 755; Stephenville, *Fernald & Wiegand* 2709; Burgeo, *Fernald, Long & Fogg* 111. QUEBEC:[2] Cap à l'Aigle, *Macoun* 69303. NEW BRUNSWICK: Miscou Island, *Blake* 5580; Bathurst, *Fernald & Williams* in 1902; Fairville, *Fernald, Long & Fogg* 112. NOVA SCOTIA: Cape Breton, *Nichols* 1252; Sable Island, *St. John* 1156, *Macoun* 22649; Bridgewater, *Fernald & Long* 23384; Argyle Head,

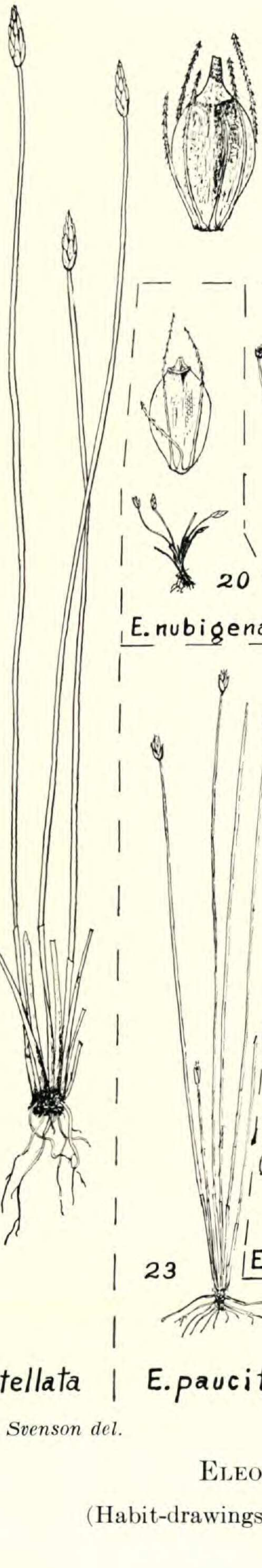
"Keine Publizität erlangte," and that according to a letter from Ascherson only two examples of these plates exist, one at Montpellier, the other at Paris. (2) Plates 63 and 64 were reproduced, although much reduced in size, by C. & W. Barbey, *Herborisations au Levant*, t. 8 (1882). This reproduction was made by photography from the Montpellier plates. Since 1882 is the date of publication of Barbey's plates, it becomes the date of publication of *Scirpus pollicaris* and other Delile species figured therein. (3) Junk, *Bibliographia Botanica*, 215 (1909) states that in 1895 eleven examples of plates 63 and 64 were sold at auction by Porquet in Paris. This may be the source of plates which I have seen at the Gray Herbarium, Arnold Arboretum, and New York Botanic Garden.

[1] I have seen no specimens from the interior except from New York and Michigan. Reports from the interior of California are based upon *E. Lindheimeri* (Cucamonga, *Bigelow* in 1854) or upon *E. leptos* var. *Johnstonii* (San Bernardino Mts.). See note by P. A. Munz, Bull. So. Calif. Acad. Sci. xxiv. 47 (1925).

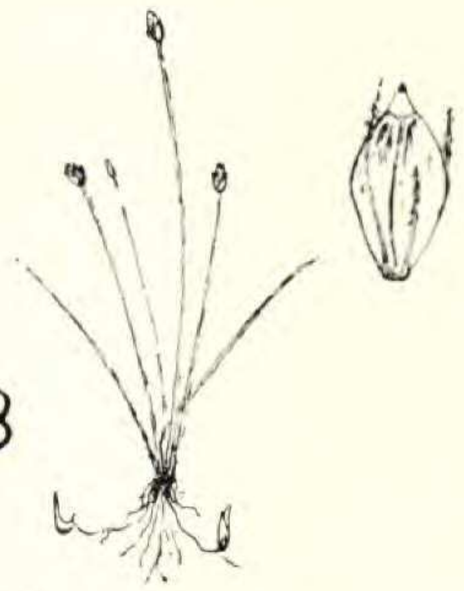
[2] *Svenson & Fasset* 980 from Riv. du Loup, Quebec, and 978, 981 and 982 from New Brunswick, issued as *Scirpus nanus* are all diminutive and sterile *Sagittaria graminea*.

Fernald & Long 23385; Weymouth, *Fernald et al* 20171. MAINE: Perry, *Fernald* 1394; Bar Harbor, *Knight* 5307; Wells Beach, *Fernald* in 1898. NEW HAMPSHIRE: Hampton, *E. F. Williams* in 1911. MASSACHUSETTS: Nahant, *Boott;* Barnstable, *Fernald & Long* 18040; Hyannisport, *Greenman* 369; Marthas Vineyard, *Seymour* 1101. RHODE ISLAND: Middletown, *E. F. Williams* in 1909. CONNECTICUT: Stratford, *Harger* in 1900. NEW YORK: Staten Island, *Britton* in 1889; Cayuga Co., Howland Island, *Wiegand, Randolph & Eames* 11437; Onondaga Lake, *Rowlee & H. H. Smith* in 1906. NEW JERSEY: *Green* in 1834; Cape May, *Gershoy* 151. VIRGINIA: York River, *Grimes* 4022. GEORGIA: Tybee Island, Chatham Co., *Harper* 2176. FLORIDA: Titusville, *Nash* 2311; *Chapman* (as *E. pusilla*). MICHIGAN: deer lick near Hubbardston, Ionia Co., *C. F. Wheeler* in 1887 (N. Y.). MISSISSIPPI: Ocean Springs, *S. M. Tracy* 110 (N. Y.); Ship Island, *S. M. Tracy* 5334 (N. Y.). LOUISIANA: La Plaquanim Parish, *A. B. Langlois* in 1884 (N. Y.). CALIFORNIA: Stone Lagoon, Humboldt Co., *J. P. Tracy* 6744 (P.) WASHINGTON: Westport, *J. M. Grant* in 1918 (as *E. acicularis*). BRITISH COLUMBIA: Barclay Sound, Vancouver Island, *J. Macoun* 42 (N. Y.). CUBA: Havana, *Ekman* 767; *Rugel* 905 (without locality). BRAZIL: Rio de Janeiro, *C. Ule* 14356 (U. S.).

Noted originally from the vicinity of Halle, Germany, by Sprengel (1807) who identified it with *Scirpus fluitans* L., but later (1813) published it as *Scirpus nanus*. Wallroth presented an excellent diagnosis of the plant (1805), but in 1822, because of a pre-existing *Scirpus nanus* (Poir. Encyc. vi. 759 (1804) = *Fimbristylis argentea*), described it as *Scirpus humilis*. Due to an existing *Eleocharis nana* Kunth, Enum. ii. 140 (1837), a South American plant, the name *Eleocharis parvula*, originating from *Scirpus parvulus* Roemer & Schultes (1817) and in current usage in Europe, should be maintained. Vahl (1805) described *Scirpus pusillus* from America, based to some extent upon *Scirpus capillaceus* of Michaux (which has since been identified as *Eleocharis acicularis*), but with "culmis teretis" and the achene "acute trigonum" and in the Gray Herbarium is a Beyrich specimen from southern United States labeled "*Scirpus pusillus* Vahl!" This specimen is clearly *Eleocharis parvula*. However, since the name, *Eleocharis pusilla*, was taken up by Robert Brown, Prodr. 225 (1810), it does not become available for use here, whatever may be the status of Vahl's material. Elliott in the *Sketch of the Botany of South Carolina* (1816), p. 75, describes the achenes of *Scirpus capillaceus* as "compresso obovato." I have not had the opportunity of seeing the Elliott herbarium, which is at Charleston,

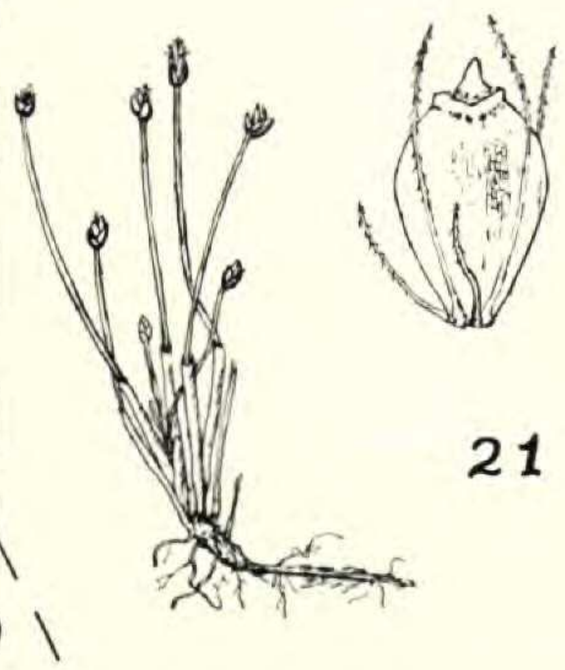


E. parvula

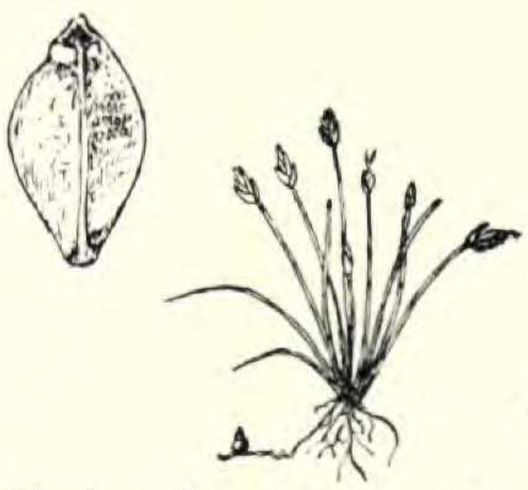


E. leptos

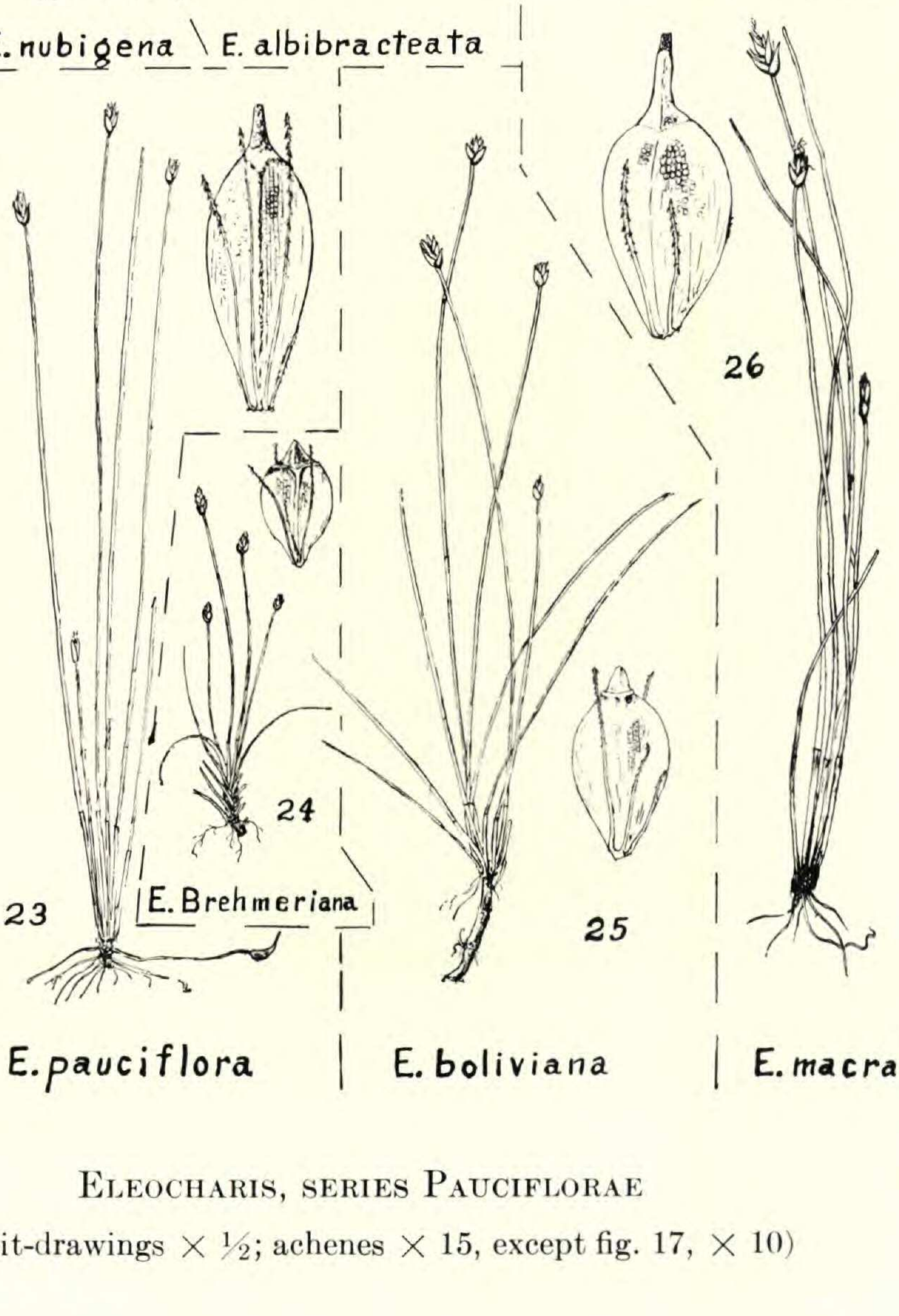
E. nubigena



E. albibracteata



E. leptos var. Johnstonii



E. Brehmeriana

E. rostellata | E. pauciflora | E. boliviana | E. macrantha

H K. Svenson del.

ELEOCHARIS, SERIES PAUCIFLORAE

(Habit-drawings × ½; achenes × 15, except fig. 17, × 10)

South Carolina, but the plant described is probably not *Eleocharis parvula*.

The map published by Birger (l. c.) shows in detail the distribution of this species in northern Europe. Confusion in identification has been largely with *E. acicularis* and especially with *E. acicularis* var. *submersa*, but the recognition of *E. parvula* is not difficult if the tubers are present. Glück, Untersuch. ueber Wasser-und Sumpfgewächse, iii. 577 (1911), discusses the culture of this plant, which he was able to grow in fresh water; and *Scirpus parvulus* forma *submersus* Glück, which is always sterile, is described and figured by him (l. c. fig. 104).

17. E. PAUCIFLORA (Lightf.) Link. FIG. 23. Erect, from creeping rootstocks; the stolons often with conspicuously thickened buds: culms slender, 1.5–4 dm. high, striate: sheath 2–3 cm. long, straw-colored or brownish, truncate: spikelets 4–7 mm. long, ovate, 2–7-flowered: scales all flower-bearing, chocolate-brown with pale scarious margins and tip; the two lower larger: stamens 3; the filaments often whitened and elongated: style trifid: achenes obovoid or fusiform, 2–3 mm. long, in cross-section triangular or plano-convex, prominently reticulate with small rectangular cells; the triangular or lanceolate beak tipped by the dark style: bristles slender, irregularly toothed, equalling or exceeding the achene, sometimes poorly developed.—Hort. Berol. i. 284 (1827); Hegi, Ill. Fl. Mitteleur. ii. 40. t. 43, fig. 5 (? 1909). *Scirpus pauciflorus* Lightf. Fl. Scot. ii. 1078 (1777); Hornem. Fl. Dan. xi. fasc. xxxii. 3, t. mdccclxii. (1827); Reichb. Ic. Fl. Germ. viii. 38, figs. 707, 708 (1846); Anderss. Cyp. Skand. 9, t. 1. fig. 21 (1849); C. B. Clarke in Hook. f. Fl. Br. Ind. vi. 654 (1893) and in Engler, Bot. Jahrb. xxx. Beibl. 68: 26 (1901); Aschers. and Graebn. Syn. ii.[2] 296 (1904); Jepson, Fl. Cal. pt. vi. 199, fig. 18 (1922); Blomgren in Holmberg, Skand. Fl. 311 (1926). *S. Baeothryon* L. f. Suppl. 103 (1781);[1] Vahl Enum. ii. 244 (1805). *S. sepium* Honck. Verz. All. Gew. Teutsch. i. 78 (1782). *S. Halleri* Vill. Plant. Dauph. ii. 188 (1787). *S. quinqueflorus* Vitm. Summa Pl. i. 150 (1789). *S. campestris* Roth in Usteri, Ann. Bot. xiv. 18 (1795).[2] *E. Baeothryon*

[1] The specific name *Baeothryon* was founded upon one of the "nomina usualia" of Ehrhart, Linnaeus f. citing "Baeothryon. *Ehrh. phytoph. n. 31.*" The *Phytophylacii* were sets of exsiccatae which Ehrhart issued in 1780 and later. Their names were published in the "Index Phytophylacii Ehrhartiani" in 10 decades, in Ehrhart's Beitraege, iv. 147 (1789). In an autobiographical sketch Ehrhart mentions both the Linnean Supplement and the Phytophylacii (Usteri, Ann. Bot. xix. 5 (1796)). The "decades" were accompanied by the "nomina usualia," which were never intended for scientific use. However, Farwell and also House have taken up one of these names *Trichophyllum* as antedating *Eleocharis*. For a discussion of Ehrhart's names see Barnhart, RHODORA, xxii. 180–182 (1920), and Fernald, RHODORA, xxix. 226 (1927).

[2] Moessler, Handb. 91 (1833) refers to *Scirpus Baeothryon*, α *major* Dreves & Hayne, Choix Pl. Eur. iv. t. 94 (1802) and β *minor* (*S. campestris* Roth, Dreves & Hayne, l.c

Presl. Fl. Čech. 11 (1819).[1] *Limnochloa Baeothryon* Reichenb. in Moessl. Handb. ed. 2, iii. 1808 (1829) and Fl. Germ. Excurs. 78 (1830). *Clavula Baeotryon* Dum. Fl. Belg. 143 (1827). *Baeothryon pauciflorum* A. Dietr. Sp. Pl. ii. 90 (1833). *Baeothryon Halleri* T. F. Nees, Gen. Germ. Ic. ii. 17 (1843). *E. atacamensis* Philippi, Fl. Atacam. 53 (1860); Boeckl. Linnaea, xxxvi. 454 (1869–1870); Philippi, Anal. Univ. Chil. v. 93 (1896); Barros, Anal. Mus. Nat. Hist. Buenos Aires, XXXIV. 486, fig. 31 (1928). *S. andinus* Philippi, Anal. Univ. Chil. (1873) 554. *Cyperus pauciflorus* Missbach & Krause in Sturm, Fl. Deutsch. ed. 2, ii. 27, t. 7. (1900).—Wet calcareous soil, Newfoundland and Quebec to northern New England, New York, Indiana and Illinois. Also in western United States and western Canada, especially at high altitudes. Europe, Asia and South America. From many North American specimens the following are cited. NEWFOUNDLAND: Straits of Belle Isle, Eddies Cove Brook, *Fernald, Wiegand & Long* 27524; Flower Cove, *Fernald et al* 26328; Bonne Bay, *Fernald & Wiegand* 2712; Bay of Islands, *Mackenzie & Griscom* 10116; Grand Falls, *Fernald & Wiegand* 4757. QUEBEC: Anticosti, *Victorin & Germain* 25779; Magdalen Islands, Grindstone Island, *Fernald et al* 6964; Gaspé Co., Madeleine R., *Fernald, Dodge & Smith* 25497; L'Islet, *Victorin* 3074; Bonaventure Co., New Richmond, *Fernald & Williams* in 1902. NEW BRUNSWICK: Victoria Co., Gorge of Aroostook River, *Fernald* 1395. NOVA SCOTIA: Baddeck Bay, *Fernald & Long* 20180. MAINE: Fort Fairfield, *Fernald & Robinson*, Pl. Exs. Gray. 3; Monticello, *Fernald & Long* 12822; Sangerville, *Fernald* 246. NEW HAMPSHIRE: Stewartstown, *Moore* 3962. VERMONT: Willoughby Mountain, *Tuckerman* in 1859, *Boott* in 1863. NEW YORK: Herkimer County, State Marsh, *Haberer* 1154; Tioga County, Spencer Lake, *Eames & Wiegand* 11438; Cayuga County, Springport, *Eames & Wiegand* 9347; Sodus Point, *Henderson* in 1874; Watertown, *Crawe*. PENNSYLVANIA: Presque Isle, *Garber* in 1869. ONTARIO: Galt, *Herriot* 1; Pt. Colburne, *Macoun* 34565; Point Edward, *Macoun* 34566; Lake Nipigon, *Macoun* in 1884. INDIANA: Lagrange, *Deam* 36640A. ILLINOIS: Ringwood, *Vasey* in 1860–1861. MICHIGAN: Saginaw Bay, *C. K. Dodge* 16; Charlevoix, *Wheeler* in 1892; Sault Ste. Marie, *Churchill* in 1910. WISCONSIN: Door Co.,

t. 95). These plates represent *Scirpus Baeothryon* and *Scirpus campestris*, respectively. According to Dreves & Hayne *S. campestris* is differentiated by (1) smaller size, (2) by the sterile culms which are shorter than the fertile, (3) by the linear spike during flowering, (4) the scales of uniform length, (5) 3 or 4 flowers in a head, etc. From their excellent presentation it appears that *S. campestris* is merely a dwarf state of *E. pauciflorus*.

[1] This combination was incorrectly referred by Presl to Roemer & Schultes, who, Enum. ii. 123 (1817), published *Scirpus Baeothryon*. *Eleocharis Baeothryon* Schultes, Mant. ii. 92 (1824) refers to *Scirpus* no. 6 of Muhlenberg, Desc. Gram. 29 (1817), habitat in New York and "*S. Baeothryo* affinis." It is impossible to identify this plant, although indications point to either *E. pauciflora* or *E. rostellata*. Asa Gray was unable to identify it in the Muhlenberg Herbarium. Torrey Ann. Lyc. N.Y. 315 (1836), through error, cites *Scirpus* no. 7, thereby identifying it with *S. tuberculosus* Michx.

Rowley's Bay, *Pease* 18000. SASKATCHEWAN: Bredenberg, *Herriot* 73106; Cypress Hills, *Macoun* 294 and 298. [NORTH?] DAKOTA: *Leiberg* 1947. ALBERTA: Banff, *Butters & Rosendahl* 1329; Lake Louise, *Macoun* 64180. MONTANA: Monida, *M. E. Jones* 9384 (P). WYOMING: Fort Bridger, *Porter* in 1863; Yellowstone Park, *A. Nelson* 6159; North Park, *Osterhout* in 1896. COLORADO: Sangre de Christo Mts., *Hicks* 82; Ruxton Dell, *Clements* 350; Empire, *Patterson* in 1892; Seven Lakes, *Clements* 479. UTAH: Salt Lake Co., Big Cottonwood Canyon, *Garrett* 1960. BRITISH COLUMBIA: Laggan, *Wheeler* 1057; Glacier Park, *Fogg* 1179. WASHINGTON: Douglas Co., *Leiberg & Sandberg* 416. OREGON: Des Chutes River, *Peck* 9706; Upper Klamath Lake, *Peck* 9494; Crook Co., *Leiberg* 225; Mt. Jefferson, *J. C. Nelson* 2852; Imnaha River, *Cusick* 3127. CALIFORNIA: Soda Springs, *M. E. Jones* in 1881 (P); Summit, Nevada Co., *M. E. Jones* in 1902 (P); Shepherd's Canyon, *M. E. Jones* in 1897 (P); Yosemite Valley, *Bolander* 6236; Desolation Valley, *Smiley* 334; Round Valley, San Jacinto Mts., alt. 8900 ft., *Munz* 6050 (P); Bluff Lake, San Bernardino Mts., alt. 7400 ft., *Munz* 10683 (P). The following specimens have been seen from South America: CHILE: Prov. Nuble, Banos de Chillan, *Werderman* 1297; Prov. Atamaca, Dept. Copiapo, *Werderman* 966; vic. of Porterillos, Dept. Chañaral, *I. M. Johnston* 4711.[1]

Blomgren (l. c.) reports *Eleocharis pauciflora* from Sweden in bogs, wet meadows (especially meadows by the seashore) or moist pastures and roadsides; for the most part on calcareous ground, ascending the lower mountains. In northeastern United States the plant is rare, occurring almost entirely on marl bogs or on wet calcareous ledges.

Although known in Europe from early times it was first adequately described by Lightfoot from the Scottish highlands. It has served as the type of the genus *Baeothryon* of several authors. The achenes vary greatly in length and diameter of the beak, the degree of reticulation and the prominence of the angles. Watson, Bot. Calif. ii. 221 (1880) noted that "The species has usually been included under *Scirpus*, but there appears to be no good reason for separating it from *Eleocharis*, inasmuch as it has all of the characters which distinguish that genus from *Scirpus*. The tubercle is identical in character with that of *E. rostellata* and its allies, and such as is not found in *Scirpus*, where the style is slender and never tubercle-like at base." The tubercle appears distinct in both color and

[1] Specimens collected by Dr. Johnston in Chile were compared by him with the type of *E. atacamensis* in the Philippi herbarium and are the same in height and in form, size, surface and bristles of the achene. I am unable to separate these specimens from *E. pauciflora*.

texture from the body of the achene and the style itself, and a thorough examination of the species of *Scirpus* which might be considered close to this species, has convinced me that *E. paucifloras* and its allies stand clearly apart from *Scirpus*.

Var. **Suksdorfiana** (Beauverd), n. comb. Erect from a short caudex: culms 2–3 dm. tall, wiry, compressed and conspicuously sulcate, 1 mm. wide: spikelets 5–9 mm. long, 9–12-flowered: achenes as in *E. pauciflorus*.—*E. Suksdorfiana* Beauverd, Bull. Soc. Bot. Genève. sér. 2, xiii. 267 (1922).—In boggy mountain meadows, Washington and Oregon. WASHINGTON: Skamania Co., *Suksdorf* 2237 (TYPE COLL.); Falcon Valley, *Suksdorf* 2537 and 2820; Mt. Adams, *Suksdorf* 90 in 1882 (as *S. pauciflorus*). OREGON: Burns, Harney Co., *L. F. Henderson* 8663, in part. (Herb. Univ. Oregon).[1]

This plant was distributed as a questionable *Eleocharis rostellata* (which it greatly resembles in height, coarseness, and short, thickened rootstock), but was clearly separated by Beauverd from *E. rostellata* by its purple, fibrous roots, variation of spirals in the inflorescence, non-persistent scales, and the number of flowers in a spikelet. However, the short spikelets, purplish roots, the conspicuously reticulated and elongated achenes, and the long slender bristles, show that the affinity of this plant is with *E. pauciflora*. Transitional specimens such as *A. Nelson*, Wyoming in 1902 make it best to treat the plant as a variety of *E. pauciflora*.

Var. **bernardina** (Munz & Johnston), n. comb. According to the original description, it differs from *E. pauciflora* "in its spreading recurved stems, densely caespitose turf-forming habit, and smaller, smoother and less sharply-angled achenes. It grows in the Canadian zone of the San Bernardino Mountains where the frequent colonies are conspicuous because of their gray-green color, low dense growth and sharply defined limits."—*Scirpus bernardinus* Munz & Johnston, Bull. Torr. Bot. Club, lii. 221 (1925).—CALIFORNIA: San Bernardino Co., south fork of Santa Ana River, 8500 ft. (2600 m.), *Munz* 6187 (TYPE in Pomona College Herb.); south fork of Santa Ana River, 8200 ft. (2500 m.), *Hall* 7608; south fork of Santa Ana River, 7600 ft. (2300 m.) *Munz* 10804 (G, P); Pinos, Santa Barbara, *R. Hoffmann* in 1927 (P.).

I think this plant should be regarded as a variety of *Eleocharis pauciflora*. The specimen, *Munz* 10804, in the Gray Herbarium, has achenes somewhat smaller than is usual in the species, but the spikelets do not seem to have been well developed. *Munz* 10683, from the

[1] This specimen was loaned to me by Dr. M. E. Peck. The label carries the notation "has little bulbs of which the white geese seem very fond."

San Bernardino Mountains, distributed as *Scirpus pauciflorus*, has achenes which vary greatly from the normal in being shorter, with a less-extended beak, with prominent almost costulate angles and a peculiar varnished surface. It shows the glaucous coloration and the thickened rootstocks of 10804, but has the upright habit and thickened buds so characteristic of *Eleocharis pauciflora*. I am inclined to treat this plant also as var. *bernardina*, laying stress on the thickened rootstocks, glaucous wiry culms and the short (2 mm. long) achene with the very prominent angles. From this point of view, it may perhaps be considered as a distinct species, but some of the specimens of *Eleocharis pauciflora* collected in the mountains of Colorado, namely *Clokey* 3424 and *Clements* 479 and 350, also have hardened bases and glaucous culms and therefore approach the var. *bernardina*, so that it is difficult to decide definitely the status of the plant. Recently I have received additional material from Dr. Munz. His no. 10804 in the herbarium of Pomona College is abundantly fruiting and the achenes vary from obtusely triangular to biconvex.

18. E. ROSTELLATA Torr. FIG. 17. Erect or arching from a short vertical rootstock; roots thickened, whitish: culms wiry, conspicuously flattened and sulcate 2.5–15(–22) dm. in length, 1–2 mm. wide, often reclining and rooting from the apex: sheaths rigid, truncate or oblique: spikelet spindle-shaped, acute, 12–20-flowered, 8–20 mm. long: scales light-brown, rigid, ovate, the uppermost becoming acute: stamens 3; the filaments often elongated and whitened: style 3-fid: achene obovoid, obtusely triangular or plano-convex, olive, shiny, under magnification lightly reticulate, 2–3 mm. long, narrowed into the obtuse light-green beaked style-base, which is about one-third the length of the achene: bristles firm, regularly toothed, light-brown, equalling the achene.—Fl. N. Y. ii. 347 (1843); Robinson & Fernald in Gray Man. ed. 7: 185, fig. 263 (1908). *E. rostellata* var. *occidentalis* Wats. Bot. Cal. ii. 222 (1880). *E. rostellata* var. *Congdoni* Jepson, Fl. Cal. 196 (1922). *Scirpus rostellatus* Torr. Ann. Lyc. N. Y. iii. 318 (1836).—Salt marshes, Nova Scotia to Florida; rare inland about salt springs and in calcareous bogs in the eastern United States, becoming common in the alkaline regions of the West. Also in Bermuda, Cuba and Mexico. From many specimes the following are cited. NOVA SCOTIA: Yarmouth Co., Sand Beach, *Fernald et al.* 20165; Tusket, *Fernald et al.* 20167; Argyle Head, *Fernald et al.* 23383; Central Chebogue, *Pease & Linder* 20166. MASSACHUSETTS: Medford, *Boott* in 1865; Harwich, *Fernald* 16332; Edgartown, *Seymour* 1606. RHODE ISLAND: Providence, *Olney*. CONNECTICUT: New Haven, *Harger* in 1887. NEW YORK: Conquest, *Wiegand*

5919; Junius, *Wiegand* 1770, *Sartwell;* Penn Yan, *Sartwell;* Bergen Swamp, *Clinton* in 1865, *House* 6529. NEW JERSEY: Hackensack Marshes, *T. F. Allen* in 1863; Atlantic City, *Parker* in 1871. DELAWARE: Appoquinimink, *Commons* in 1866. VIRGINIA: Williamsburg *E. J. Grimes* 2660. FLORIDA: Miami, *Garber* in 1877. ONTARIO: Courtland, *Macoun* 34488; Galt, *Herriot* 39. MICHIGAN: Hubbardston, *Wheeler* in 1890. INDIANA: Houghton Lake, 2 mi. northeast of Culver, *C. C. Deam* 45067. ILLINOIS: Ringwood, *Vasey.* OKLAHOMA: Greer Co., *Stevens* 1016.1; Kiowa Co., *Stevens* 990; Fairvalley, Woods Co., *Stevens* 1652. TEXAS: Hemphill Co., *Eggert* in 1901; *Reverchon* 7 (in 1885); *C. Wright* 709, 1934. WYOMING: Mammoth Hot Springs, *Nelson* 6044. UTAH: Great Salt Lake, *Rydberg & Carlton* 6902; Monroe, *M. E. Jones* 5409b. ARIZONA: Ft. Huachuca, *Lemmon* 2907. NEVADA: Soda Springs, *Shockley* 280. NEW MEXICO: *C. Wright* 1931, 1956. BRITISH COLUMBIA: Kootanie Lake, *Macoun* 7386; Alberni, Vancouver Island, *Macoun* 32,223 (C). CALIFORNIA: San Bernardino, *Parish* 1570, *W. G. Wright* in 1879; Death Valley, *Coville* 586; Owens Valley, *Horn* in 1863; S. Cal., *Parry & Lemmon* 398; Chino Creek, Ontario, *I. M. Johnston* 1137 (P). MEXICO: Sonora, *Thurber* 380; Durango, *Palmer* 189; Puebla, alt. 2120 m., *Arsène* 1474 (U. S.). BERMUDA: *Britton et al.* 1896. CUBA: *C. Wright* 3769. HAITI: *Leonard* 4199.

Described by Torrey from specimens collected by Sartwell at Penn Yan in central New York. Plants from western United States, described as var. *occidentalis* are taller. *C. Wright* 1946 from New Mexico (in Gray Herb.) reaches 19 dm., and Coville[1] mentions a plant with culms 2.23 meters long, but these plants present no other consistent variations. Var. *Congdoni*, reported from California, has a beak and bristles somewhat shorter than the average, but is scarcely distinct. Throughout its range, *Eleocharis rostellata* is variable, especially in the shape of the tubercle, which is at times lanceolate, and again broadly triangular.

19. E. **leptos** (Steudel), n. comb. FIG. 19. Similar to *E. parvula:* erect or arching, from fibrous roots: culms capillary, 3–4 cm. high: spikelets about 3 mm. long, 4–6-flowered, ovate, acute: scales ovate or ovate-lanceolate, membranous, with a scarious margin, and a green keel bordered by brown or purple bands: style 3-fid: stamens 3: achene 1 mm. long, obovate, triangular, the inner face broader and the outer angle obtuse, greenish or light-brown, the surface finely verrucose: bristles wanting.—*Isolepis leptos* Steud. Cyp. 91 (1855). *E. pygmaea* Torr. var. β? *anachaeta* Torr. Ann. Lyc. N. Y. iii. 441 (1836). *Scirpus leptos* Wright in Sauv. Fl. Cub. 176 (1873). *S. parvulus* "*var.*" Boeckl. Linnaea, xxxvi. 478 (1869–1870). *S.*

[1] Coville, Bot. Death Valley Exp., Contrib. U. S. Nat. Herb. iv. 212 (1893).

nanus var. *anachaetus* (Torr.) Britt. Trans. N. Y. Acad. Sci. xi. 75 (1892).—Cuba and Louisiana, westward to Nevada and Mexico and south to Venezuela. LOUISIANA: *Hale* [Red River, acc. to Torrey, Bot. Pac. R. R. Exp. 192 (1857)] (G, N. Y.); near New Orleans, *Drummond* 409, type collection of *E. pygmaea* var. β? *anachaeta* (N. Y.); borders of ponds near James River, *Nicollet* Exp. (N. Y.); NEVADA: Winnemucca, Reno (?), *F. H. Hillman* in 1897 (P). CUBA: *C. Wright* (without number). MEXICO: Tampico, *Palmer* 433; Mazatlan, Sinaloa, *Rose, Standley & Russell* 14105 (N). VENEZUELA: tidal lagoons, Santa Rosa near Maracaibo, *Pittier* 10485 (U. S.) in part (a fragment mixed with *E. maculosa*).

Isolepis leptos was founded on *Parry* 130 from Mexico, which I have not been able to obtain. It was identified by C. Wright with the Cuban plant. Boeckeler, Flora lxiv. 78 (1880) later identified *Isolepis leptos* as a "forma minima" of *Eleocharis triflora*. *E. leptos* has usually been identified with *E. parvula*, but in its almost plano-convex, lightly reticulated achene, without bristles, it appears distinct. In the mountains of western United States it passes into

Var. **coloradoensis** (Britton), n. comb. Coarser and more wiry, but not exceeding 4 cm. in height: spikelets 4 mm. long, and the achenes 1.2–1.5 mm. long.—*Scirpus coloradoensis* Britton, Torreya, iv. 93 (1904).

There is in the Gray Herbarium a specimen of the TYPE collection, *J. H. Cowen* 2576, Shore Lake, Larimer County, Colorado. Although the plant is rather immature the achenes are larger (about 1.2 mm.) than the specimen (*Palmer* 433) from Mexico, and the spikelets are more conspicuously colored with brown. An immature specimen in the Gray Herbarium was collected in IDAHO: *J. F. Macbride* 311, Falk's Store, Canyon Co.

Var. **Johnstonii**, n. var. (FIG. 22), culmis crassioribus, rigidis, compressis, recurvatis; spiculis 4–5 mm. longis; achaeniis 1.5 mm. longis.—Known from a single collection: CALIFORNIA: alkaline shore of Baldwin Lake, San Bernardino Mts. (alt. 7000 ft.), *I. M. Johnston* in 1924 (G, P) (TYPE in Gray Herbarium).

20. E. MACRANTHA Boeckl. FIG. 26. Roots fibrous, brown, rather fleshy: culms soft, erect, striate and sulcate, 8–16 cm. high, about 0.5 mm. in diameter: sheaths firm at the apex, suboblique: spikelets broadly ovate, obtuse, 4–12-flowered, 5–8 mm. long: scales ovate-oblong, acuminate, with brown keel and translucent stramineous sides, spreading and disclosing the achenes: style 3-fid: stamens 3; filaments elongated and flattened: achene obovate, equilaterally triangular, 2.5 mm. long, including the style-base, stramineous; the surface somewhat spongy and finely reticulate: style-base subulate-conic,

nearly 1 mm. long, triangular, with prominent lateral furrows: bristles 3–6, many-toothed, irregular, but not equalling the style-base.—Linnaea, xxxvi. 453 (1869–1870); Boiss. Fl. Orient. v. 387 (1884). *Scirpus hexatrichus* Ehrenberg mss. acc. to Boeckl. (l. c.). SYRIA: "Zwischen die grossen Quelle inter Brumana aus Libanon" *A. Kneucker* in 1904 (G).

Boissier (l. c.) reported it from the littoral region about Beirut (*Ehrenberg*), and added that only one specimen had been seen, and that further observation was needed.

This species is very close to *E. pauciflora*, from which it seems to differ in the larger, broadly ovate heads, and the narrower beak.

21. E. ALBIBRACTEATA Nees & Meyen. FIG. 21. Rootstock extensively creeping, ligneous, brown: culms 2–15 cm. high, slender, rigid and sulcate, sometimes recurved: sheaths deep-brown, with apex oblique and acute, rigid but with a scarious edge; spikelets 2–5 mm. long, broadly ovate, 3–6-flowered, appearing almost black: scales obtuse or acute, striate, shining, black mingled with reddish-brown, sometimes with a whitish region near the margin; the lowest often with a broad greenish midrib: style 3-fid: stamens 3: the filaments flattened and elongated: achene obovoid, trigonous (the abaxial angle obtuse), about 1.5 mm. long, yellow, shining at maturity; the surface somewhat spongy and finely reticulate; the lower part of the style-base thickened and reticulate (triangular in cross-section), as broad as the apex of the achene, the upper part forming a short conical beak: bristles light-brown, strongly toothed, equalling or slightly exceeding the achene.—Nees & Meyen ex. Kunth, Enum. ii. 143 (1837); Linnaea, ix. 294 (1835) *nomen nudum;* Meyen, Reise, 484 (1834) *nomen nudum;* Boeckl. Linnaea, xxxvi. 423 (1869–1870); C. B. Clarke in Engler, Bot. Jahrb. xxx. Beibl. 68: 23 (1901); Hauman & Vanderveken, Phanerog. Arg. i. 208 (1917); Barros, Anal. Mus. Hist. Nat. Buenos Aires, XXXIV. 465, figs. 20a, 20b (1928). *Chaetocyperus albibracteatus* Nees & Meyen in Mart. Fl. Bras. ii.[1] 95. (1842) and Nov. Act. Caes. Leopold Nat. Cur. xix. Suppl. i. 95 (1843) pl. Guianense excl.; Steud. Cyp. 74 (1855) as *C. albobracteatus*. *E. melanocephala* Desv. in C. Gay, Fl. Chil. vi. 175, t. 71, fig. 1 (1853); R. Fries, Alpine Fl. Arg. 169 (1905). *Scirpus melanocephalus* Griseb. Symb. Fl. Arg. 311 (1879). *S. albibracteatus* (Nees & Meyen) Kuntze, Rev. Gen. i. 757 (1891).—Peru (TYPE region: Lake Titicaca[1]) to Valdivia, Chile (acc. to C. B. Clarke), Juan Fernandez, and in the Andes of Argentina. Also in Ecuador (acc. to C. B. Clarke in Engler, Bot. Jahrb., Beibl. 68: 23 (1901), prope Pomasqui, *Sidero* n. 199). —The following specimens have been examined. BOLIVIA: La Paz, *Buchtien* 4481 (U. S.), *Bang* 71[a] (U. S.). CHILE: Prov. Atacama, Dept. Copiapo, common in subalkaline vega, alt. 2500 meters, *I. M.*

[1] Meyen, Reise, p. 484.

Johnston 4840; Dept. Chañaral, in slightly alkaline meadow, *I. M. Johnston* 4710; Dept. Copiapo, in wet meadow, alt. 2200 m., *I. M. Johnston* 4827; Province of Nuble, Baños de Chillan, open grassy flats, alt. 1800–2000 m., *F. W. Pennell* 12409; Valdivia, *Philippi* (U. S.). ARGENTINA: Prov. Jujuy, Moreno, 3500 m. *R. E. Fries* 695 (U.S.).

The first effective publication, Kunth, Enum. ii. 143 (1837), was based upon a fragmentary specimen and is far less satisfactory than the later publication of *Chaetocyperus albibracteatus*. It is unfortunate that the name *E. albibracteata* must be retained instead of the much more descriptive *E. melanocephala*, for although in young spikelets the pallid midrib of the lowest scale may be prominent, in material which I have seen the pale coloration almost entirely disappears when the spikelets are mature. *Limnocharis albibracteata*, cited in synonymy by Kunth (l. c.), was based upon a misreading of *Limnochloa* in Nees' manuscript (*cf.* Nees, Nov. Act. l. c. footnote). The specimens collected by *Johnston* and cited above were compared by him with authentic material in the Philippi herbarium.

22. E. BOLIVIANA Palla. FIG. 25. Culmis fasciculatis, ex rhizomate erecto (ca. 2 mm. crasso), striatis, sulcatis (ca. 0.5 mm. crassis), 9–14 cm. altis, saepe recurvatis; vaginis fuscis ad basin rufescentibus, apice firmis, truncatis vel subobliquis; spiculis 3–5 mm. longis, late ovatis, 4–8-floris; squamis ovatis, acutis, rufescentibus, in carina interdum viridescentibus, infima obtusa, viridi-vittata; stylo 3-fido; achaenio 1.5 mm. longo (cum stylobasi), obovoideo, triangulo, angulis costatis, viridescenti, lutescente, subtiliter reticulato; stylobasi triangulo, conico, ad achaenium annulo toroso angusto albescenti instructo; setis 6, brunneis, retrorsum dentatis, achaenium superantibus. —Palla in Buchtien, Contrib. Fl. Bolivia, i. 88 (1910), name only. BOLIVIA: La Paz, 3750 m., Jan. 1, 1919, *Buchtien* 4482 (TYPE in Gray Herbarium).

The name only is given by Buchtien, and the species was to have been described in an ensuing volume. *E. boliviana* is close to *E. albibracteata*, from which it differs in larger stature, paler spikelets, and more sharply angled achene, with less conspicuous reticulation and much narrower style-base.

23. E. NUBIGENA C. B. Clarke. FIG. 20. Culms 1–8 cm. long, filiform, from a ligneous creeping rootstock: upper sheath truncate, green, firm: spikelets 2.5–3 mm. long, 3–7-flowered, dark-brown, acute or obtuse: scales glossy-brown, with a green midrib, broadly ovate, somewhat acute; the lowest obtuse; style 3-fid; stamens 3: achene obovoid, triangular, with the outer angle obtuse, 1.5 mm. long,

greenish to light-brown, lightly reticulate: style-base triangular-conic, ½–⅓ as wide as the achene, brown, with a whitened ridge at its junction with the body of the achene: bristles 3–4, light-brown, slender, shorter than or exceeding the achene.—C. B. Clarke in Engler, Bot. Jahrb. xxxvii. 518 (1906) and Kew Bull. Add. Ser. viii. 22 (1908); Barros, Anal. Mus. Nat. Hist. Buenos Aires, XXXIV. 485, fig. 30 (1928). *E. crinalis* Griseb. forma *humilis* Boeckl., ex C. B. Clarke, Engler, Bot. Jahrb. xxxvii. 518 (1906).—In the Andes from Ecuador to Argentina. The specimens of *E. nubigena* in the Gray Herbarium are: ECUADOR: *Spruce* 5913 (TYPE COLLECTION); BOLIVIA: Prov. Larecaja, vic. Soratá, alt. 3100–4100 m., *Mandon* 1414 (in part); vic. La Paz, 10,000 ped., *Bang* 71[a].

Spruce 5913 "in Andibus Ecuadoribus" is the type collection. C. B. Clarke also cites specimens as follows: "B o l i v i a: Puna Patanca, 3700 m s m. in locis humidis (FIEBRIG n. 2636, c. fl. mense Januario, 2887); in Andibus (MANDON n. 1413, LORENTZ et HIERONYMUS n. 65)." In Kew Bull. Add. Ser. (l. c.) the editor has cited "Mandon nn. 14, 13" which obviously refers to *Mandon* 1413 or to both 1413 and 1414; and adds the locality "Argentina, Nevado del Castillo" for *Lorentz & Hieronymus*, No. 65. The *Mandon* specimens are notoriously mixed. *Mandon* 1414 in the Gray Herbarium consists in part of *E. nubigena* and in part of a plant with many-flowered spikelets in a juvenile state. *Mandon* 1414 in the Stockholm Museum is a mixture of *E. nubigena* and *Scirpus cernuus* var. *dura*. *Mandon* 1413 in the Stockholm Museum is *E. costulata* Nees & Meyen.

This dwarf, few-flowered plant is closely related to *E. albibracteata*, from which it differs in smaller stature, paler scales, and narrow ridge at the junction of the achene and style-base. None of the specimens which I have seen exceed 5 cm. in height.

24. E. BREHMERIANA Boeckl. FIG. 24. Dwarf; culms numerous, 3–7 cm. high, from an elongated ligneous rhizome, erect or arching, sulcate: sheaths reddish at base; the apex truncate and forming a ferruginous ring: spikelet ovate, 8–15-flowered: scales ovate, obtuse, dark-brown, with a lighter midrib: style 3-fid: stamens 3: achene 1 mm. long, abbreviated-obovate, golden-yellow, shining, with broadly convex sides and prominent angles, the surface lightly reticulate: style-base brown, pyramidal, nearly as broad as the achene, not articulated, but often with a ridge at the junction of the style-base and the body of the achene: bristles 4–6, brown, slender, equalling the achene.—Allg. Bot. Zeitschr. ii. 33 (1896).—Based on *Mandon* 1416 (in part) from Bolivia. The following specimens have been examined. BOLIVIA: Prov. Larecaja, vic. Soratá, 2600–2900 m., *Mandon* 1416

(mixed with *E. Dombeyana*); southern Bolivia, Padcaya, 2000 m. *Fiebrig* 2524 (issued as *Scirpus cernuus* var. *dura*).

This species differs from *E. nubigena* in the larger and broader spikelets, which have a greater number of flowers, although I have not been able to find any with 20–40 flowers as Boeckeler (l. c.) states. The achene is more turgid, golden-yellow, and the style-base broader than in *E. nubigena*.

Species doubtful or not seen

All these are members of a group very complex in the Andes and not well understood.

E. MELANOMPHALA C. B. Clarke in Engler, Bot. Jahrb. xxx. Beibl. 68: 24 (1901); Barros, Anal. Mus. Hist. Nat. Buenos Aires, xxxiv. 469, fig. 21 (1928).—CHILE, Cordillera, alt. 2100 m. Paso Cruz 34° S. lat. *O. Kuntze* no. 30. "Planta, cum nuce magna, *E. atacamensi* primo aspectu similis, differt stylobasi a nuce conspicue distincta."

E. SIMULANS C. B. Clarke in Engler, Bot. Jahrb. xxx. Beibl. 68: 20 (1901) and Ill. Cyp. t. xxxvi, figs. 19–24 (1908). *Scirpus andinus* Phil. Anal. Univ. Chil. 554 (1873).—"Nux obovoidea plano-compressa, apice triangularis; stylibasis vix incrassata, cum apice nucis usa . . . . Inter *Scirpum* et *Eleocharidem* quasi media." "Chile (herb. Delessert); Santiago, Cordillera (PHILIPPI n. 36)."

E. LECHLERI Boeckl. Linnaea, xxxvi. 422 (1969–1870); C. B. Clarke in Engler, Bot. Jahrb. xxx. Beibl. 68: 24 (1901); Barros, op. cit. xxxiv. 471, fig. 22 (1928).—Culms 2–5 cm. long, caespitose: achene trigonous, smooth, yellow, abruptly narrowed at apex, lightly striate: style-base depressed-conic, subdisciform, as wide as the achene.—CHILE: Cordillera del Ranco, *Lechler* 795.

E. PLATYPUS C. B. Clarke in Engler, Bot. Jahrb. xxxiv. Beibl. 78: 3 (1904) and Kew Bull. Add. Ser. viii. 23 (1908).—Culm 10–25 cm. long: spikelet 1.8 cm. long: achene ellipsoid, trigonous: style-base "conica, e cellulis magnis rotundo-ellipticis conspicua, in nuce sessili cum hac fere fusa."—Based upon a specimen collected by *Spruce* near Guano, Ecuador.

Geographical Distribution of Series Pauciflorae

The series *Pauciflorae* comprises about 10 species, which occur in saline or alkaline regions, and, except for a rather phenomenal development in the southern Andes, are confined to the Northern Hemisphere. *Eleocharis pauciflora* is a wide-ranging species of boreal alkaline regions in Eurasia and North America, extending south into the Alps and Himalayas and the high mountains of western

United States, reappearing in the southern Andes at an elevation of 7000–10,000 feet.

In Syria the poorly known *E. macrantha* is probably a derivative of *E. pauciflora*.

E. rostellata, on the other hand, seems to be of southern derivation. Sweeping northward from the West Indies and the Gulf of Mexico it forms extensive turf in the salt marshes along the New England coast as far north as southern Maine, and then reappears in southern Nova Scotia, behaving in this manner as the plants of coastal plain affinity. It then occurs sparingly in marl bogs and about salt springs in New York, Indiana, and Michigan. In the high limestone plateau south of the Mohawk River it is certainly not of recent introduction, but seems to have followed the retreating ice of the Wisconsin glaciation, and lodged in a few alkaline areas.[1] In the western United States it is difficult to separate this species from some forms of *E. pauciflora*.

E. parvula, which may perhaps be considered the most primitive member of the section, is found in saline mud along the Atlantic coast of Europe and North America, and to a more limited extent the Pacific coast of North America, and occupies that practically unchanging habitat, the sea-margin. From this species *E. leptos* seems to have been derived, passing from the smooth and sharply angled achene of *E. parvula*, to a slightly verrucose plano-convex achene. *E. leptos* occupies alkaline places in the interior of southwestern United States and northern Mexico and, like *E. pauciflora* and *E. parvula*, produces conspicuous tuber-like buds.

Explanation of Plate 189

(Habit-drawing × ½; achenes × 15, except fig. 17, × 10)

Fig. 17, Eleocharis rostellata, Connecticut, *Harger* (culms, unusually low), achene, New York, *Sartwell;* 18, E. parvula, Newfoundland, *Fernald & Wiegand* 2709; 19, E. leptos, Mexico, *Palmer* 433; 20, E. nubigena, Ecuador, *Spruce* 5913; 21, E. albibracteata, Chile, *Johnston* 4840; 22, E. leptos var. Johnstonii, California, *Johnston;* 23, E. pauciflora, Newfoundland, *Fernald & Wiegand* 4757 (achene unusually elongate); 24, E. Brehmeriana, Bolivia, *Mandon* 1416; 25, E. boliviana, Bolivia, *Buchtien* 3750; 26, E. macrantha, Syria, *Kneucker*.

[1] Svenson, Effects of Post-Pleistocene Marine Submergence, Rhodora, xxix. 107 (1927).

Series Aciculares

(Plate 190)

a. Culms coarse, 0.5–1 mm. in diameter, usually elongated....*b*.
b. Culms strongly flattened (ancipital), about 1 mm. wide, 2–3 dm. high; apex of sheath scarious; achenes without bristles (No. Am.).....30. *E. Wolfii*.
b. Culms not strongly flattened, about 0.5 mm. thick....*c*.
c. Apex of sheath scarious; bristles exceeding the achene (Mex.) 31. *E. acicullariformis*.
c. Apex of sheath firm, divergent; bristles equaling or shorter than the achene (So. Am.).....32. *E. bonariensis*.
a. Culms capillary, usually dwarf, less than 0.5 mm. in diameter..*d*.
d. Spikelets 8-many-flowered....*e*.
e. Culms 1.5–2 dm. high, finely capillary; spikelets purplish-brown; achenes 0.5 mm. long (No. Am.).....33. *E. Reverchonii*.
e. Culms not exceeding 8 cm. in height (except rarely in *E. acicularis*)....*f*.
f. Rootstocks extensively creeping....*g*.
g. Culms and scales light-green; anthers 0.3–0.4 mm. long; white bristles exceeding the achene.....26. *E. Lindheimeri*.
g. Culms dark-green; scales green, with brown markings; anthers 1 mm. long; bristles usually inconspicuous or wanting.....25. *E. acicularis*.
f. Plants cespitose, annual (?), rarely exceeding 4 cm. in height....*h*.
h. Trabeculae about 15 in a longitudinal series....*i*.
i. Anthers 0.2–0.3 mm. long; achene 0.6–0.7 mm. long 27. *E. cancellata*.
i. Anthers 0.7 mm. long; achene 0.4–0.5 mm. long; scales conspicuously attenuate.....28. *E. brachycarpa*.
h. Trabeculae about 30 in a longitudinal series; anthers 0.4 mm. long; achene 0.7–0.8 mm. long.....29. *E. bella*.
d. Spikelets 3–6-flowered....*j*.
j. Style-base elongate-falcate; achene 1.5–1.8 mm. long (including style-base).....36. *E. stenocarpa*.
j. Style-base not elongate-falcate....*k*.
k. Achene 1.5 mm. long; scales spreading and prominently striate.....34. *E. nervata*.
k. Achene 0.7–1.1 mm. long....*l*.
l. Anthers 0.5 mm. long, prominently apiculate...35. *E. costulata*.
l. Anthers 1 mm. long, not prominently apiculate..25. *E. acicularis*.

VARIETIES AND FORMS OF E. ACICULARIS

a. Bristles, when present, finely capillary, equaling or only slightly exceeding the achene....*b*.
b. Culms capillary (rarely triangular), soft....*c*.
c. Spikelets lanceolate; achenes terete or obscurely triangular; tubercle apiculate; bristles finely capillary, often absent var. *typica*....*d*.
d. Culms much elongated, submersed or with floating tips..*e*.
e. Culms always sterile, growing on the bottom in deep water f. *inundata*.
e. Culms sterile; plants extensively branching.....f. *longicaulis*.
e. Some of the culms fertile, elongated, their tips floating on the surface.....f. *fluitans*.
d. Culms not conspicuously elongated....*f*.

f. Culms fertile, dwarf and somewhat rigid, not exceeding 3 or 4 cm. in height.....f. *rigidula.*
f. Culms triangular.....f. *triangularis.*
c. Spikelets linear; culms finely capillary, elongated (So. U. S.) var. *gracilescens.*
b. Culms rigid....*g.*
g. Culms dwarf, sterile, short and thick, transparent, without longitudinal furrows (Boreal and Arctic).....var. *submersa.*
g. Culms rigid, coarsely striate; achenes furrowed and somewhat flattened; tubercle depressed; bristles absent (W. No. Am.).....var. *occidentalis.*
a. Bristles coarse, brown, much exceeding the achenes (E. Asia) var. *longiseta.*

The forms described herein are to be expected under unusual ecological conditions; the varieties are geographical segregates which displace typical *E. acicularis* at the extremes of its range.

25. E. ACICULARIS R. & S. var. **typica**. Usually forming close mats: culms 2–20 (rarely –25) cm. high, capillary, deep-green, usually angular and sulcate: rootstocks capillary, with abundant stolons; roots firm, white: sheaths loose, reddish-striate at base; the apex scarious and somewhat inflated: spikelets ovate to linear, 2–7 mm. long, acute, 3–15-flowered (usually 5–8-flowered): scales ovate-lanceolate, acute, green, with reddish-brown sides and scarious margins, usually only a few subtending mature fruit: achene 0.7–1 mm. long, obovate-oblong, yellow to white or brown, obscurely 3-angled, with many longitudinal ribs and close trabeculae (about 40–50 in a longitudinal series): style-base narrow, somewhat compressed, conical-triangular: bristles 3–4, brownish, very slender, equalling the achene, often wanting.—*E. acicularis* R. & S. Syst. ii. 154 (1817); Kunth. Enum. ii. 141 (1837); Britton, Journ. N. Y. Micr. Soc. v. 104 (1889); Terracciano, Malpighia, ii. 314 (1888); Hegi, Ill. Fl. Mitteleur. ii. 41 (?1909). *Scirpus acicularis* L. Sp. Pl. i. 48 (1753); Aschers. & Graeb. Syn. ii.[2] 303 (1904); Blomgren in Holmberg, Skand. Fl. pt. ii. 309 (1926). *Mariscus acicularis* Moench, Meth. 350 (1794). *Cyperus acicularis* With. Arr. Brit. Pl. ed. 3, ii. 78 (1796);[1] Missbach & Kraus in Sturm, Fl. Deutsch. ed. 2, ii. 23, t. 6, fig. 1 (1900). *E. costata* Presl. Fl. Cech. 11 (1819). *Isolepis acicularis* Schlecht. Fl. Berol. i. 36 (1823). *Scirpus Chaeta* Schultes, Mant. ii. 72 (1824).[2] *Clavula acicularis* and *C. comosa* Dumort. Fl. Belg. 143 (1827). *Scirpidium aciculare* Nees, Linnaea, ix. 293 (1834). *Chaetocyperus acicularis* Nees in Mart. Fl. Bras. ii.[1] 95

[1] Not ed. 1: 78 (1776) as Richter states. Withering notes the "straws and leaves as fine as a horse hair; the former is not 4-cornered, as Hudson said, but though cylindrical it is often compressed and fluted. As the spike is more properly 2-rowed, . . . as Haller observed, it ought, . . . to be considered as a Cyperus; and the absence of hairs or bristles at the base of the seed adds confirmation to this opinion."

[2] Merely a synonym of *S. trichodes* Muhl., which is not identifiable with *S. trichoides* HBK.

(1842) in part; Steud. Cyp. 74 (1855).—ILLUSTRATIONS: Fl. Dan. ii. t. cclxxxvii.; Svensk. Bot. ix. t. 605; Curtis, Fl. Lond. ed. 2; iv. 49;[1] Sm. Eng. Bot. t. 749; Engl. Bot. ed. Syme, t. 1585; Britton & Brown, Ill. Fl. i. fig. 587; Gray, Man. ed. 7, fig. 250.—Widespread at the margins of ponds, rivers and ditches in the Northern Hemisphere, forming marked varieties at the borders of the range. According to Hultén, Fl. Kamt. i. 164 (1927), "from Iceland, northern Scandinavia and northern Perm south to northern Spain,[2] northern Italy, Tauria and Astrakhan; also in Caucasus. Asia: at Obi from about 67° N. lat., at Yeinisei from about 64° N. lat., and from Kamtchatka south to Pamiroalajsk Prov., Yunnan, Kuantung, Corea and Honshu." In the Gray Herbarium typical North American specimens are represented from southern Newfoundland and southern Labrador west to British Columbia, south to Pennsylvania, West Virginia, central Indiana, central Illinois, Iowa, Missouri, Nebraska, northern Wyoming and northern Idaho. From numerous specimens the following may be cited: NEWFOUNDLAND: Grand Falls, *Fernald & Wiegand* 4705; St. Johns, *Fernald & Wiegand* 4701; Whitbourne, *Fernald, Long & Dunbar* 26,326. QUEBEC: *Longueuil, Victorin* 9346; Riv. Goynish, North Coast, *Victorin & Rolland-Germain* 18126; Natashquan, *H. St. John* 90,182; Lac Tremblant, Terrebonne Co., *J. R. Churchill* in 1922. PRINCE EDWARD ISLAND: Grand Tracadie, *Fernald & St. John*, 928. NOVA SCOTIA: Uniacke Lake, Hants Co., *Fernald, Bartram & Long* 23377; Gavelton, Yarmouth Co., *Fernald, Long & Linder* 20150 (bristles lacking). MAINE: St. Francis, *M. L. Fernald* 120. NEW HAMPSHIRE: *E. F. Williams* in 1910; Gorham, *A. H. Moore* 4298. VERMONT: Wallingford, *W. W. Eggleston* 640. MASSACHUSETTS: Plymouth, *Fernald, Hunnewell & Long* 8891 (without bristles). RHODE ISLAND: Providence, *J. F. Collins* in 1892. CONNECTICUT: Southington, *C. H. Bissell* in 1899. NEW YORK: Springport, *A. J. Eames* 9336; Oneida Lake, *J. V. Haberer* 2229. NEW JERSEY: Tenafly, *H. Dantun* 18D; Singac, *H. Dantun* 18C. PENNSYLVANIA: Pocono, *J. W. Harshberger* in 1904. WEST VIRGINIA: Elkins, Randolph Co., *J. M. Greenman* 102. ONTARIO: Niagara, *J. Macoun* 34,563. MICHIGAN: Manistique, *J. H. Schuette* in 1887; Isle Royale, *W. S. Cooper* 266. OHIO: Garrettsville, Portage Co., *R. J. Webb* in 1913. INDIANA: Gibson, *O. E. Lansing* 2835; Raccoon Sta., *E. J. Grimes* 811. IOWA: Story City, *R. Coombs & C. R. Ball* 438; Iowa City, *M. P. Somes* 194. MANITOBA: east of Forest, *Herriot* 43,043. NORTH DAKOTA: Rush Lake, Huron Co., *C. K. Dodge* 15 and 17; Portal, *M. A. Barber* in 1903; Dickinson, *C. F. Wheeler* in 1908. SOUTH DAKOTA: Brookings, *T. A. Williams* in 1891; White Willow Creek, *T. A. Williams* 73. NEBRASKA: lowlands of the Missouri, *F. Clements* 2551; near Thedford, *P. A. Rydberg* 1337. COLORADO: Divide between Colorado Springs and

[1] This plate is not in the 1st edition, but is in the 2nd edition (1835).

[2] Colmeiro, Pl. Hisp. Lus. (1889), includes most of the Spanish peninsula.

Denver, *M. E. Jones* 160 (P). IDAHO: Montpelier, Bear Lake County, *Nelson & McBride* 1615; Pend Oreille Riv., *Lyall* in 1861. WYOMING: Sheridan, *A. Nelson* 2269. MONTANA: Big Fork, *J. Clemens* in 1908. BRITISH COLUMBIA: Sicamous, *J. Macoun* 7559.

Regarding its presence in India, C. B. Clarke, Journ. Linn. Soc. xxxiv. 51 (1898) says that the single specimen in herb. Rottler can hardly establish the species there. Cheeseman, Fl. N. Zealand 768 (1906), states that it is not recorded from Australia, but in the Gray Herbarium there is a single specimen from *F. von Mueller* (Victoria) which may be an introduction, since it is identical with the European form. Although Clarke cites the species as occurring in the West Indies, the only representative of the section which I have seen from there is *E. Lindheimeri*. Within the range of the typical plant there are several ecological variations which have received names and which may be summed up in the following five forms.

Forma **inundata**, n. f., sterilis, in strato in aqua profundiore crescente.—*E. acicularis* forma *submersa* Druce, Fl. Berks. 524 (1897); *Scirpus acic.*, f. *submersus* Glück, Untersuch. Wasser-und Sumpfgewächse, iii. 573, fig. 103 (1911); *S. acic.* var. *submersus* Blomgren in Holmberg, Skand. Fl. 310 (1896) in part; not *S. acic.* var. *submersus* Hj. Nilss.

This is the common submersed form growing in water 2–8 meters deep, the culms usually becoming somewhat elongated. As Druce describes it "the muddy bottom is covered with it; in this condition it does not flower. Portions brought up by the tow-rope of canal barges are easily recognized by the rhizome. Careful search along the banks will usually be successful in finding it in a fertile state." It is necessary to give this form a new name, since *S. acicularis* var. *submersus* Hj. Nilsson is to be interpreted as a dwarf plant of boreal distribution.

Forma **fluitans** (Doell.), n. comb. Growing in shallow water; culms elongated and floating, some of them fertile.—*Scirpus acicularis* f. *fluitans* Doell. acc. to Glück, l. c. 575 (1911).[1] *E. acicularis* b. *fluitans* Doell, Rhein. Fl. 160 (1843).

[1] In Doell, Rhein. Fl. 160 (1843), which is earlier than Doell, Fl. Baden, i. 311 (1857) as cited by Glück. Doell did not definitely make this a forma but published *E.* (as *H.*) *acicularis* b. *fluitans* with "f l u t h e n d e T e i c h b i n s e mit schwimmenden Halmen." Glück cites as a synonym *Sc. acicularis* forma *flliformis* Wirtgen, but this combination is likewise incorrectly made by Glück. No direct reference is given, but it is probably based on the "authentischen Exemplare W i r t g e n s (. . . Herbarium plant. crit. etc., . . . Fasic, VI, No. 252)" which, as Glück states, have culms both sterile and fertile, and up to 20 cm. in length. It is apparently what Schur. Fl. Transsyl. 691 (1885) describes as *E. acicularis* a. *fluitans* "rhizomate ramoso fibroso,

Forma LONGICAULIS (Desmaz.) Hegi. Sterile, submersed, branched, often up to a meter in length; the long culms and branches elongating in the water.—Ill. Fl. Mitteleur. ii. 42 (1909?).—This form is not uncommon in streams and sometimes in lakes, and, as interpreted by Hegi (l. c.), may perhaps include forma *fluitans*. In discussing this plant, Ascherson & Graebner give the following synonymy: *S. acicularis* β. *longicaulis* Desmaz. Cat. Pl. Omises Belg. 42 (1823). "*Clavula acicularis*" [*C. comosa*] β. *longicaulis* Dumort. Fl. Belg. 143 (1827). *S. acicularis* γ *natans* Schrad. in Lej. and Court. Fl. Belg. i. 40 (1828).[1]

Forma **rigidula** (Reichb.), n. comb. Culms short, at most 3–4 cm. long, rigid.—*Scirpus acicularis* var. *rigidula* Reichb. Ic. Fl. Germ. viii. 37, fig. 697 (1846). *S. acicularis* forma *rigidula* Junge, Cyp. Schleswigs-Holstein, 253 (1908).

Forma **triangularis** (Reinsch), n. comb. Culms triangular.—"*Heleocharis triangularis* Reinsch in Doerfler, Herb. Norm. No. 4 384. Schedae XLIV. 188 mit Holzschnitt (1902)," acc. to Aschers. & Graebn. Syn. ii.[2] 304 (1904). "**H. triangularis** Reinsch in Schedae ad Cent. XLIV des Herbar. normale, p. 108," acc. to Palla in Koch, Syn. ed. 3: 2544 (1905). *S. acicularis* II *triangularis* Aschers. & Graebn. Syn. ii.[2] 304 (1903). *Eleocharis acicularis* var. *triangularis* Rouy, Fl. France, xiii. 364 (1912). *S. acicularis* forma *triangularis* Junge, Cyp. Schlesw.-Holst. 253 (1908).

Montell[2] discusses this plant in detail. The specimens issued by him, which I have seen, are clearly dwarf *E. acicularis*. Since a translation of Montell's paper may not be readily available, I am quoting (in translation) the more important portion:

"On the shores of the river Munio [n. lat. 60, Finland], which are dry at low water, there occurs often in great abundance, a small form of *Heleocharis acicularis*, which has for a long time been considered unusual. Previously it has always appeared in the sterile

ramis longe repentibus. Culmis elongatis flaccidis; spicis minimis paucifloris, 3–5 floris, fuscis.—(Scirpus acicularis var. natans Schrad.—S. pauciflorus *Dumort.* ap. *Bluff.* et *Fingerh.* comp. 1, 1, p. 90.) . . . (S. filiformis *Sauter* dürfte hierher gehören)." The last two specific names are antedated by *S. pauciflorus* Lightf. and *S. filiformis* Lam. In this synonymy should probably be included *E. acicularis* var. β. *longicaulis* H. Watson in C. B. Clarke, Journ. Bot. xxv. 270 (1887) "culmis 3 dm. longis; spicis 7 mm. longis, atropurpureis." *S. filiformis* Sauter seems to be based on Reichb. Ic. Flor. Germ. viii. t. 294, fig. 696, and is what I have considered under forma *fluitans*.

[1] I can find no formal description by Schrader, but the source of this reference may be the supplementary description of *S. acicularis* "in aquis natantes semipedales, pedales, tenuiores" in the extensive treatment of the *Cyperaceae* by Schrader, Fl. Germ. i. 130 (1806). Lejeune and Courtois (l. c.) also describe *S. acicularis* β. *comosus* (*S. comosus* Dumort. in Mich. Agr. no. 268) "Rhizomate valde repente, cespitibus densis. In locis aqua derelictis".

[2] Montell, Mem. Soc. Fauna et Fl. Fenn. i. 43 (1927).

condition, but I have now found it blooming. Microscopic study of living specimens showed that it did not belong to *H. acicularis* in the narrower sense, but to *H. triangularis* described by P. F. Reinsch from Bavaria, which is to be distinguished from true *H. acicularis* (L.) Br. primarily through the structure of the culm. In the new species the cross-section of the culm is more or less triangular, with three air chambers: in true *H. acicularis*, rectangular, six angled, or almost elliptical, with four projections and an equal number of air chambers. These characters, according to Reinsch, are very constant. What the above-mentioned characters signify is not further mentioned in the author's description on labels issued with No. 4384 in Doerfler's 'Herbarium Normale.' Since the form which I have described seems to vary from *H. acicularis* as described in floras, it seems well to give a short description: The culms are merely 1–2 cm. high, occasionally a little taller, arched, capillary, but rather stiff and dark green. The spikelet is only 1–2 mm. long, often only 1–2-flowered."

This form is perhaps a fertile form of var. *submersa*, described below, and except from a purely anatomical point of view, is scarcely worthy of recognition. The mere fact that the culms are triangular is not of great significance; such transitions should be found between the more or less terete culms of dwarf northern plants (cf. var. *submersa*) and the quadrangular culms of the ubiquitous plants which have been accepted as typical *E. acicularis*. In attempting to define just what is typical, the pathway does not seem at all clear. Linnaeus described the culm as terete (Scirpus culmo tereti, Sp. Pl. l. c.) citing as a synonym *Scirpus magnitudine aciculae* of Flora Lapponica. Curtis in the analysis accompanying the plate of *Scirpus acicularis* in Flora Londinensis, ed. 2 (1835) comments as follows: "The culms of *Scirpus acicularis* have by most modern authors been considered tetragonous. Wahlenberg says they are striated; but I, on the other hand, have always found them to be compressed, convex on one side, and channeled on the other."

Var. **submersa** (Hj. Nilss.), n. comb. Culms dwarf, sterile, short and thick, without longitudinal furrows, transparent, simulating *Eleocharis parvula* (*Scirpus nanus*).—*Scirpus acicularis* β. *submersa* Hj. Nilss. Bot. Not. (1888) 144 (1888), not Blomgren. *E. acicularis* f. *submersa* (Hj. Nilss.) Norman, Christ. Vidensk-Selsk. Forh (1893), no. 16: 43 (1893); Ostenfeld, Fl. Arct. i. 42 (1902) excl. desc. in part. *Scirpus acicularis* f. *submersus* (Hj. Nilss.) Porsild, Meddel. Groenl.

l. 370 (1912), not of Glück, Untersuch. Wasser-und Sumpfgewächse, iii. 573, fig. 103 (1911).—This variety is represented in the Gray Herbarium by specimens collected by Porsild in West Greenland, n. lat. 70° 2′, August 10–11, 1921; from Labrador, *Fernald & Long* 27,522 (deadwater at outlet of Trout Pond, Blanc Sablon River); and apparently A. E. & R. T. Porsild in 1928 from Great Bear Lake n. lat. 67° 0′, long. 119° 45′ W. belongs here. The Labrador and Greenland plants appear as boreal segregates.[1] Porsild, Fl. Disko Island, 48 (1926), records it from Western Greenland, n. lat. 68° 20′ to 71° 42′, and mentions that it hibernates "enclosed in ice." Nilsson's description is as follows (translated):

> E. ACICULARIS L. Culms 3–10 cm. high, erect, bristle-like, opaque, striate with usually four longitudinal furrows; sheaths mostly reddish.—Common on sandy or muddy shores of ponds, ditches, etc.
>
> *β.* SUBMERSA. Culms of variable length, often short and thick, green, with whitish lower portion, terete, without longitudinal furrows, transparent, with clearly distinguishable longitudinal and horizontal partitions within. Spikelets rarely developed, usually remaining small, green, and sterile.—Shallow places in ponds and lakes, usually entirely submerged. Several localities in Norway and Sweden.

According to Nilsson the superficially similar *Eleocharis parvula* is to be distinguished by the presence of terminal buds on the stolons, and by the undulate radial walls of the epidermal cells. In *E. acicularis* these radial walls are straight. An illustration of the radial walls of both species will be found in Raunkiaer, *De Danske Blomsterplanters Naturhistorie* i. fig. 204 (1895–1899).

Var. **longiseta**[2] n. var., setis crassis brunneis, achaenio longioribus. —Eastern Asia. JAPAN: Nagasaki, *R. Oldham* 909 (coll. in 1862), TYPE in Gray Herbarium; Musashi, *Sakuraj* 52. LOO-CHOO ISLANDS, *C. Wright* 357. COREA: Port Chusan, *A. Wilford* in 1891; SIBERIA: Amur medius, *Korshinsky* in 1891.

All the material which I have seen from eastern Asia, with the exception of a specimen collected by *A. Henry* in Yunnan belongs to this well-marked variety. The Yunnan specimen, like the majority of European specimens, lacks bristles.

With two exceptions,[3] the European material which I have seen is

[1] Professor Fernald has called my attention to the similar distribution of *Alopecurus aequalis* var. *natans*, an Arctic segregate, occurring at the Straits of Belle Isle, in western Greenland, and in northern Europe.

[2] *E. acicularis* var. *longiseta* appears on a label accompanying *Oldham* 909 from Japan. According to Oliver, Journ. Linn. Soc. ix. 163 (1867), he worked over the Oldham collection, and it was to be further worked over by Maximowicz. I can find no trace of the publication of this variety.

[3] A collection by *Werenskiold* from Aas, Norway, which has coarse bristles equalling the achene and which approaches var. *longiseta;* and a collection from Hungary, Fl. Hung. Exsic. 481 ii. which has bristles half as long as the achene.

without bristles. The North American material from Newfoundland, eastern Canada, New England and New Jersey, has in general very slender, light-brown bristles equaling the achene; but plants from Cape Cod and the adjacent islands and from the sandy ponds of Plymouth County, Massachusetts, invariably have the bristles absent. This lack of bristles occurs sparingly northward, following the usual Atlantic coastal-plain distribution to southern Nova Scotia, the sandy lake-shores of central New Hampshire and the shores of Lake Champlain.

Specimens which I have seen without bristles are as follows. NOVA SCOTIA: Great Pubnico Lake, Yarmouth Co., *Fernald, Long & Linder* 20151. NEW HAMPSHIRE: Ossipee Lake, *A. S. Pease* 17889. VERMONT: Lake Champlain, Orwell, *W. W. Eggleston* in 1899. MASSACHUSETTS: Winter Pond, Winchester, *C. E. Perkins* (in part) in 1881; Arlington or vic., *C. E. Perkins* in 1883; Spot Pond, Stoneham, *W. P. Rich* in 1894; Boott Pond and Great South Pond, Plymouth, *Fernald, Hunnewell & Long* 8890 and 8891; and numerous collections from Cape Cod. The New England specimens are in the extensive collection of the New England Botanical Club.

In typical material from west of New York State, the larger number of specimens appear to have bristles, although there seems to be no regularity as regards geographic distribution.

Var. **occidentalis**, n. var., culmis rigidis, crassioribus, sulcatis et striatis, 4–7 cm. longis; spiculis 3–6 mm. longis, 6–20-floribus; squamis rigidis, brunneis, in carina fuscis; achaenio angulato, 0.9–1.1 mm. longo; stylobasi depressa, latiore quam in typica *E. acicularis;* setis nullis.—*E. acicularis* var. ? Torr. Bot. Pac. R. R. Exped. 192 (1857).[1]—Montana and Wyoming to California and northern Mexico. MONTANA: Bigfork, alt. 3000 ft., *M. E. Jones* 9381 (P), 9382 (P); Polson, alt. 2800 ft., *M. E. Jones* 9383 (P). WYOMING: Nez Perces Creek, *A. & E. Nelson* 6552. IDAHO: St. Anthony, *Merrill & Wilcox* 816; Salmon, Lemhi Co., alt. 4500 ft. *E. B. & L. B. Payson* 1889; Goose Creek, Washington Co., *M. E. Jones* (without number) (P); Montpelier, *Nelson & Macbride* 1615 (P). UTAH: Salt Lake City, *M. E. Jones* 1069 (P) in 1881 (P); Panquich Lake, *M. E. Jones* 6019b (P). NEW MEXICO: Colfax Co., *P. C. Standley* 13931; Raron, B. Mesa, *I. E. Diehl* 98 (P). ARIZONA: White Mts., *D. Griffiths* 5269. CALIFORNIA: Santa Barbara, *Rothrock* 80 (TYPE in Gray Herbarium); near San Francisco, *J. M. Bigelow* in 1853–1854; Yosemite Valley,

[1] "Culmo crasso brevi, spica ovato-lanceolata valde compressa acuta 6–7-flora. Wet places near San Francisco; April 8; not mature. Differs from the ordinary form of the plant in its stout culm (which is 2–3 inches high) and much compressed dark chestnut-colored scales. There are 3 stamens and a 3-cleft style, which has a distinct tubercle at its base; but no bristles were found."